MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2016/2017

PEM0044 – ESSENTIAL MATHEMATICS

(All sections / Groups)

27 FEBRUARY 2017
9.00 a.m. - 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of **THREE (3)** printed pages with 4 questions only, excluding the cover page.

2. Answer all **FOUR (4)** questions.

3. Write all your answers in the answer booklet provided. All necessary workings **MUST** be shown.

4. The formula sheet is attached at the end of this question paper.

Question 1 (25 Marks)

(a) Simplify $\left(m^2n^{-1}\right)^4\left(3m^5n^{-4}\right)^{-3}$.

[4 marks]

(b) Use the quadratic formula to solve $3x^2-5x+2=0$.

[6 marks]

(c) Solve the following inequality. Represent the ranges on the real number line.

$$x^2-10>3x$$

[8 marks]

(d) Find an equation of the straight line passing through point (1, 2) and is parallel to the line $y+3x=5$.

[7 marks]

Question 2 (25 Marks)

Solve the following system of linear equations by using the inverse of the coefficient matrix.

$$x+y+2z=8$$
$$2x+y+z=7$$
$$2x+2y+z=10$$

(Note : No decimals is allowed in the calculation as well as in the final answer).

[25 marks]

Continued...

Question 3 (18 Marks)

(a) Given the arithmetic sequence: 5+10+15+20+...

(i) Find the first term and the common difference.

[3 marks]

(ii) Find the 4^{th} term.

[3 marks]

(iii) Find the sum of the first 14 terms.

[3 marks]

(b) If the second and the fifth terms of a geometric sequence are 6 and 48 respectively, find the common ratio and the 12^{th} terms.

[9 marks]

Question 4 (32 Marks)

(a) Find $f'(x)$ if $f(x)=\dfrac{2x-3}{x+4}$.

[6 marks]

(b) Use the chain rule to find $\dfrac{dy}{dx}$ for the given value of x.

$y=2u^3-3u^{-2}+1, \qquad u=2x+3$

[9 marks]

(c) Find $f'''(x)$ if $f(x)=\dfrac{1}{4}x^{-2}+8x^3-2x+7$.

[6 marks]

(d) Integrate $\int\left(\dfrac{20x^9-10x^6+5x^3}{x^3}\right)dx$.

[6 marks]

(e) Evaluate $\int_2^3\left(x^3-3x^2+6\right)dx$.

[5 marks]

End of Page.

Course: Essential Mathematics
Code: PEM0044

Summary of Formulas

1. Basic Rules of Differentiation

i) $f'(x)=0$

ii) $f'(x)=nx^{n-1}$

iii) $cf(x)=cf'(x)$

iv) $f(x)\pm g(x)=f'(x)\pm g'(x)$

v) $f'(x)=u\dfrac{dv}{dx}+v\dfrac{du}{dx}$

vi) $f'(x)=\dfrac{v\dfrac{du}{dx}-u\dfrac{dv}{dx}}{[v]^2}$

vii) Chain rule: $\dfrac{dy}{dx}=\dfrac{dy}{du}\times\dfrac{du}{dx}$

viii) General power rule: Derive $[f(x)]^n=n[f(x)]^{n-1}f'(x)$

2. Basic Rules of Integration

i) $\int k\ du=ku+C$

ii) $\int u^n du=\dfrac{u^{n+1}}{n+1}+C$

iii) $\int kf(u)\ du=k\int f(u)\ du$

iv) $\int[f(u)\pm g(u)]\ du=\int f(u)du+\int g(u)du$